

- 248 -

received by interface 409 and transmitted directly to splitter 426' in subsystem 403a. (I.e., interface 409 does not block shift or otherwise process these signals.) Splitter 426' feeds the signals to each demodulator 426.

5 Under control of master controller 415, demodulator 426a basebands the channel between 204 MHz and 208 Mhz, and transmits it to switch 462a, which in turn applies this basebanded signal to modulator 410d. Modulator 410d remodulates the signal, using AM, to the frequencies

10 between 12 MHz-16 Mhz. Thus, the effect of this modulation/demodulation is simply to shift the signal to the new band. The output of modulator 410d is fed to switch 401, and that device directs the signal through signal separator 413b onto extended pair 405b.

15 If subsystem 403c (Fig. 25c) is provided instead of subsystem 403a, the processing and signal flow work similarly. In this case, RF processors 485 convert the selected signal to the channel between 12 MHz and 16 Mhz.

If local network interfaces 404 are provided, they

20 can receive the digital signals from extended pairs 405, amplify them, convert them in frequency, and retransmit them onto local networks 411, all using the techniques described above. If local network interfaces 404 are not provided, these are signals transmitted directly onto local

25 networks 411 confined within a channel whose bandwidth is the same as the original channel confining the digital signal.

Referring to Fig. 35, the digital signals transmitted onto local networks 411 are received by digital

30 video receiver 505. This device is not shown connected to any local network in Figs. 21a or 21b. It is shown connected to TV 492b and local network 411b, however, and it coordinates with the rest of the system components in the same manner as video receiver 419b.

- 249 -

In a general sense, this receiver is identical to television transceiver 15, shown in Fig. 2 in U.S. Patent No. 5,010,399. Specifically, video processing circuitry 506 corresponds to RF converter 19, coupling network 513 corresponds to coupling network 18, and control signal processing circuitry 514 corresponds to control signal processing circuitry 17.

Video signals from local network 411b are blocked from telephone device 414b by the low pass filter and are directed by coupling network 513 to video processing circuitry 506. Coupling network 513 and circuitry 514 function identically to their corresponding components in transceiver 15.

Like RF converter 19, video processing circuitry 506 converts the received video signal to a form that is tunable by ordinary televisions. The following process is used, however, because the signal is an analog representation of a bitstream that represents a video signal.

In the first stage of the processing, the video signal is basebanded in the ordinary fashion. The elements in Fig. 35 show the steps of this process: shifting to an intermediate channel by mixing with a local oscillator, filtering of the intermediate channel, and then demodulation. Using the example above, the 16 MHz-20 Mhz signal may be shifted to the 40 MHz-44 Mhz band, filtered, and then detected, resulting in a basebanded signal. Alternatively, the "intermediate channel" can be fixed at 16 MHz-20 Mhz, removing the need for frequency shifting.

In the second stage, the basebanded analog signal is converted to a digital bitstream, which is decompressed in real time. In the classic procedure, a digital process reads the bitstream and uses that data to fill out a matrix of storage locations representing the pixels of the image. This matrix is refreshed 60 times a second, the "refresh

- 250 -

rate" of NTSC video. The actual NTSC signal is then created by scanning across the storage locations (conceptually, the pixels of a frame) just as a video camera creates a picture by scanning across a photoconductive grid.

The third stage is the modulation stage. The newly recreated NTSC signal is passed to this stage at baseband. It is mixed using a local oscillator, creating an AM NTSC signal in the ordinary manner. This signal is passed to TV 10 492b.

Note that channel selection still takes place in the ordinary manner. Using the examples above, IR transmitter 493b issues infrared signals that are detected by the IR sensitive diode of receiver 505. These signals are converted by circuitry 514 to, for example, a .5 Mhz signal centered at 23 Mhz. (This is the frequency used for communication of control signals in Fig. 28.) These signals are applied to local network 411b and transmit to master controller 415 using the circuitry and signals paths described in the sections above. In response to this signal, controller 415 can instruct demodulator 426a to select a different channel from among the 60 available between 200 MHz-440 Mhz on communication line 402.

When FM communication techniques are not sufficient due to the length of extended pairs 404 and the nature of local networks 411, communication of the video signals in compressed digital form is indicated, even if signals are provided by communication line 402 in analog form. In that event, digitization and compression are performed prior to transmission onto extended pairs 405. This conversion can take place in signal distribution subsystem 403a.

Referring to Fig. 25a, the desired result can be achieved by replacing one of modulators 410 for every digital video signal provided by processor 418. The new processors 410 are similar in that they receive a

- 251 -

basebanded video signal and output an analog waveform confined within a particular channel at a signal level that creates radio energy just below the legal limits. The difference is that the waveform now represents a compressed  
5 digital bitstream, which in turn represents the original NTSC signal.

The above description includes the components used to transmit digital video signals from transceiver/switch 400 to local networks 411. Similar techniques can be used  
10 for transmission in the opposite direction but are not specifically described herein.

N. Transmission of Video Signals Across  
Computer Communication Networks with  
"Star" Configurations (Fig. 36)

As described in the summary section, in many office  
buildings, the telephone wiring is not the only network of  
twisted pair wiring that extends to each office and  
converges at a common point. Over the past several years,  
common communication networks that connect personal  
20 computers, known as Local Area Networks or LANs, have begun  
to use twisted pair wiring for their conductive paths. In  
the typical configuration, a digital electronic device  
serves as the "hub" for such a system, and a separate  
twisted pair wire connects from the hub to each of the  
25 computer nodes in a "star configuration". In this section,  
the techniques described for communication across wiring  
networks that conduct telephone communication are extended  
to provide the same communication capabilities across  
computer networks that used twisted pair wiring and adopt  
30 such a "star" configuration.

To illustrate such a star configuration, one need  
only change a few of the elements of the setup shown in  
Fig. 21b. The result is shown in Fig. 36. One change is  
that PBX 500 is replaced by communications hub 519, which  
35 is the digital device that serves as the "nerve center" of  
the communication system. Another change is that line 475'

- 252 -

is not required. Finally, telephone devices 514 are replaced by computers 518, which are the devices that communicate across the network using the concepts described herein.

5       The only fundamental change required when the communication medium is provided by this new system is that the lower bound on the frequencies available for communication with line 402 (or for communication between the RF transmitters, receivers, and transceivers connected  
10 to the local networks) will be higher. Specifically, the lower bound must be above the highest frequency used for communication between computers 518 and hub 519. For example, when the computer communication system follows the 10 Base T standard, which is the most popular standard for  
15 local area networks that use twisted pair wires, the computers communicate at frequencies up to 15 Mhz, and the lower bound must be above that above that frequency.

Following are the electronic changes that should be made to provide all of the functions discussed above:

20       1) The low pass filters connecting between computers 518 and local area networks 511 must have higher cutoff values. Specifically, the cutoff frequency must be high enough to pass the communication  
25 signals transmitting between hub 519 and computers 518.

      2) The cutoff frequency of low pass filters 474 (Fig. 22) is increased in a similar fashion. The cutoff frequency of  
30 low pass filter 442 should also be increased if local network interfaces 404 are provided.

      3) The cutoff frequency of hi-pass filter 451, which is part of signal  
35 separators 413 shown in Fig 9a, should be raised above the highest frequency used by computers 518. Thus, this filter will not pass some of the lower frequency signals it passed previously.

40       4) The spectral distributions shown in Fig. 23 will not be available if they overlap the frequencies used by the computer

- 253 -

signals. Higher frequencies can be used.

5) The minimum frequencies suggested in Section C will also not be available if they overlap the frequencies used by the computer signals.

O. Preventing Unintended Reception  
and Control Signal Confusion

The problem of energy from one extended pair crossing over to a second pair and causing interference with video signals was described above. One proposed solution was to lower the susceptibility to interference by encoding the signals using frequency modulation. Susceptibility would be reduced because of the low "capture ratios" exhibited by FM receivers.

A second problem is caused by energy crossover, however, that may not be adequately addressed by low "capture ratios." This problem is one that arises when the second pair is not being used to conduct video signals, and the energy crossing onto that wire is sufficient to allow reception of the signal on the local network to which the second extended pair connects. A related problem is where the control signal transmitted onto one extended pair crosses over to a second pair, causing transceiver/switch 400 to react as if a control signal had genuinely been applied to the second pair.

The proposed solution is to ensure that a signal always transmits onto each of the extended pairs in a bundle within each of the channels used for transmission, whether or not a genuine signal is intended for conduction at that channel. A convenient way of doing this is to transmit the unmodulated carrier for every channel onto those wire pairs that are not intended to conduct a signal at that channel. Similarly, continuously transmitting the carrier of the control signal can solve the related problem of control signal "confusion."

Following is an example using the signals listed in Fig. 28. Note that video signal V is transmitted onto

- 254 -

extended pair 405a between the frequencies of 7 Mhz and 22 Mhz. This signal is created by frequency modulating a carrier of 14.5 Mhz, and is received by local network interface 404a and relayed onto network 411a. Assuming  
5 that signal V was not transmitted onto extended pairs 405b and 405c but crosses over onto pairs 405b and 405c, there would be a danger that the crossover signal V could be received by local network interfaces 404b and 404c. (Fig. 28 shows that signal V is indeed transmitted to networks  
10 411b and 411c between 1-6 Mhz, but we will ignore that fact for the purposes of this example.) The proposed solution is to transmit the unmodulated 14.5 Mhz carrier onto extended pairs 405b and 405c, lowering the SNR of the crossover video signal V received by local network  
15 interfaces 404b and 404c below acceptable levels.

Continuing the example, users at network 411a may issue infrared control signals that are transmitted over extended pair 405a by modulating a carrier with a fundamental frequency of 23 Mhz. Theoretically, these  
20 signals can crossover onto extended pairs 405b and 405c, incorrectly exciting control signal processor 420 in transceiver/switch 400. The proposed solution is to have video receivers 419b and 419c continuously feed their 23 Mhz carrier, unmodulated, onto networks 411b and 411c (from  
25 which they are relayed onto extended pairs 405b and 405c by local network interfaces 404b and 404c.)

Still other embodiments are within the scope of the following claims.

CLAIMS

1. A system for communicating video signals between a source of said signals and a destination of said video signals, said system comprising:

5 a transmitter coupled between said source and a first location on a telephone link that carries voice signals from at least one telephone connected to said link, said transmitter including

circuitry for frequency modulating said video  
10 signals from said source in a selected frequency band that exceeds frequencies of said voice signals, and

circuitry for coupling said frequency modulated signals onto said telephone link; and

a receiver coupled between a second location on said  
15 telephone link and said destination, said receiver including:

circuitry for recovering said frequency modulated signals from said telephone link,

circuitry for demodulating said frequency  
20 modulated signals to reproduce said video signals, and

circuitry for applying said reproduced video signals to said destination.

2. The system of claim 1 wherein said circuitry for coupling includes circuitry for impeding said voice signals  
25 from being coupled from said telephone link to said frequency modulation circuitry.

3. The system of claim 2 wherein said circuitry for impeding includes a filter for passing said frequency modulated signals and substantially rejecting said voice  
30 signals.

4. The system of claim 1 wherein said circuitry for recovering includes circuitry for impeding said voice

256

signals from being coupled from said telephone link to said frequency demodulation circuitry.

5. The system of claim 4 wherein said circuitry for impeding includes a filter for passing said frequency modulated signals and substantially rejecting said voice signals.

6. The system of claim 1 further comprising circuitry, coupled between said telephone and said telephone link, for impeding said frequency modulated signals from being coupled from said telephone link to said telephone.

7. The system of claim 6 wherein said circuitry for impeding includes a filter for passing said voice signals and substantially rejecting said frequency modulated signals.

8. The system of claim 1 wherein said destination includes a television for displaying said video signals from said receiver.

9. A transmitter adapted to be coupled between a source of video signals and a first location on a telephone link that carries voice signals from at least one telephone connected to said link, said transmitter being adapted for use with a receiver coupled between a second location on said telephone link and a destination of said video signals so that signals transmitted by said transmitter on said telephone link can be recovered by said receiver and applied to said destination, said transmitter including circuitry for frequency modulating said video signals from said source in a selected frequency band that exceeds frequencies of said voice signals, and

circuitry for coupling said frequency modulated signals onto said telephone link for transmission to said receiver.

10. The transmitter of claim 9 further comprising  
5 circuitry for connecting a second telephone to said telephone link at said first location,  
circuitry for impeding voice signals from being coupled from said second telephone to said frequency modulation circuitry, and  
10 circuitry, coupled between said second telephone and said telephone link, for impeding said frequency modulated signals from being coupled to said second telephone.

11. The transmitter of claim 9 wherein said receiver includes  
15 circuitry for recovering said frequency modulated signals from said telephone link at said second location,  
circuitry for demodulating said frequency modulated signals to reproduce said video signals, and  
circuitry for applying said reproduced video signals  
20 to said destination.

12. A receiver adapted to be coupled between a location on a telephone link that carries voice signals from at least one telephone connected to said link and a destination of video signals, said receiver being adapted  
25 for use with a transmitter coupled between another location on said telephone link and a source of said video signals, the transmitter frequency modulating said video signals and transmitting the frequency modulated signals on said telephone link, said receiver including  
30 circuitry for recovering said frequency modulated signals from said telephone link,  
circuitry for demodulating said frequency modulated

signals to reproduce said video signals, and  
circuitry for applying said reproduced video signals  
to said destination.

13. The receiver of claim 12 further comprising  
5 circuitry for connecting a second telephone to said  
telephone link at said location,

circuitry for impeding voice signals from being  
coupled from said second telephone to said frequency  
demodulation circuitry, and

10 circuitry, coupled between said second telephone and  
said telephone link, for impeding said frequency modulated  
signals from being coupled to said second telephone.

14. The receiver of claim 12 wherein said  
transmitter includes

15 circuitry for performing said frequency modulation  
in a selected frequency band that exceeds frequencies of  
said voice signals, and

circuitry for coupling said frequency modulated  
signals onto said telephone link.

20 15. A system for communicating audio signals  
between a source that produces said signals at a  
predetermined fidelity level and a destination of said  
signals, said system comprising:

a transmitter coupled between said source and a  
25 first location on a telephone link that carries voice  
signals from at least one telephone connected to said link,  
said transmitter including

circuitry for converting said audio signals to  
a frequency band that exceeds frequencies of said voice  
30 signals in a manner that substantially preserves said  
predetermined fidelity level,

circuitry for coupling said converted signals

onto said telephone link; and

a receiver coupled between a second location on said telephone link and said destination, said receiver including:

5           circuitry for recovering said converted signals from said telephone link,

          circuitry for reconverting said recovered signals from said frequency band to audio signals in a manner that substantially preserves said predetermined

10 fidelity level, and

          circuitry for applying said audio signals to said destination.

16. The system of claim 15 wherein

          said circuitry for converting comprises circuitry  
15 for modulating said audio signals in said frequency band, and

          said circuitry for reconverting includes circuitry for demodulating said signals recovered from said telephone link from said frequency band to reproduce said audio  
20 signals.

17. The system of claim 15 wherein said source produces said audio signals in a pair of channels and said destination is adapted to receive said audio signals in said pair of channels,

25           said transmitter including circuitry for modulating the audio signals in each of said channels in said frequency band, and circuitry for coupling said modulated signals from each channel onto said telephone link, and

          said receiver including circuitry for demodulating  
30 said signals recovered from said telephone link and reproducing said audio signals in each of said channels, and circuitry for coupling each channel of said audio signals to said destination.

18. The system of claim 17 wherein  
said circuitry for modulating is adapted to modulate  
said video signals in said channels in different portions  
of said frequency band, and
- 5        said receiver includes circuitry for separating said  
recovered signals into said channels each of which  
corresponds to one of said portions of said frequency band,  
and circuitry for demodulating said recovered signals in  
each said channel.
- 10        19. The system of claim 18 wherein said receiver  
further comprises circuitry for controlling the amplitude  
of the recovered signals in each of said channels.
20. The system of claim 16 wherein said modulating  
includes frequency modulation.
- 15        21. The system of claim 16 wherein said modulating  
includes amplitude modulation.
22. The system of claim 15 further adapted for use  
with a source of video signals and a destination of said  
video signals, wherein
- 20        said transmitter is also adapted to be coupled  
between said source of said video signals and said first  
location on a telephone link said transmitter further  
including
- 25        circuitry for converting said video signals to  
a frequency band different from said frequency band for  
said converted audio signals and that exceeds frequencies  
of said voice signals, and
- 30        circuitry for coupling said converted video  
signals onto said telephone link with said converted audio  
signals; and
- said receiver is also coupled between said second

location on said telephone link and said destination of said video signals, said receiver further including

circuitry for recovering said converted video signals from said telephone link,

5 circuitry for reproducing said video signals from said recovered signals, and

circuitry for applying said reproduced video signals to said destination thereof.

23. The system of claim 22 wherein said transmitter  
10 further comprises

circuitry for impeding said converted video signals from being coupled to said circuitry for converting said audio signals, and

circuitry for impeding said converted audio signals  
15 from being coupled to said circuitry for converting said video signals.

24. The system of claim 22 wherein said receiver further comprises

circuitry for impeding said recovered video signals  
20 from being coupled to said circuitry for reconvertng said audio signals, and

circuitry for impeding said recovered audio signals from being coupled to said circuitry for reconvertng said video signals.

25 25. A system for communicating video signals and audio signals between respective sources that produces said signals and respective destinations of said signals, and for communicating control signals between a source thereof and at least one of said video source and said audio  
30 source, said system comprising:

A. a transmitter coupled between said video source and said audio source and a first location on a telephone

link that carries voice signals from at least one telephone connected to said link, said transmitter including

video processing circuitry for converting said video signals to a first frequency band that exceeds  
5 frequencies of said voice signals,

audio processing circuitry for converting said audio signals to a second, different frequency band that exceeds frequencies of said voice signals,

circuitry for coupling said converted video  
10 signals and said converted audio signals onto said telephone link;

B. a receiver coupled between a second location on said telephone link and said video destination, said audio destination, and said source of said control signals, said  
15 receiver including:

circuitry for recovering said converted video signals from said telephone link and reproducing said video signals therefrom,

circuitry for recovering said converted audio  
20 signals from said telephone link and reproducing said audio signals therefrom,

circuitry for applying said reproduced video signals to said destination thereof and for applying said reproduced audio signals to said destination thereof,

25 circuitry for receiving said control signals from said source,

circuitry for converting said control signals to a third frequency band that is different than said first frequency band and said second frequency band and that  
30 exceeds frequencies of said voice signals, and

circuitry for coupling said converted control signals onto said telephone link for transmission to said transmitter;

C. said transmitter further comprising  
35 circuitry for recovering said converted control

signals from said telephone link and reproducing said control signals therefrom, and

circuitry for applying said reproduced control signals to said at least one of said video source and said audio source.

26. The system of claim 25 wherein said source of said control signals radiates said control signals as infrared signals,

said circuitry for converting said control signals including circuitry for producing electrical signals that correspond to said infrared signals in said third frequency band,

said circuitry for reproducing said control signals including circuitry for generating infrared signals that correspond to said electrical signals, and

said circuitry for applying said reproduced control signals including circuitry for radiating said generated infrared signals for reception by said video source and said audio source.

27. The system of claim 25 wherein said transmitter further comprises

a filter disposed between said video processing circuitry and said coupling circuitry for passing substantially only signals in said first frequency band therebetween,

a filter disposed between said audio processing circuitry and said coupling circuitry for passing substantially only signals in said second frequency band therebetween, and

a filter disposed between said circuitry for recovering said converted control signals from said telephone link and said circuitry for applying said reproduced control signals to said sources for passing

substantially only signals in said third frequency band therebetween.

28. The system of claim 25 wherein  
said circuitry for recovering said converted video  
5 signals in said receiver comprises a filter for passing  
substantially only signals in said first frequency band,  
said circuitry for recovering said converted audio  
signals in said receiver comprises a filter for passing  
substantially only signals in said second frequency band,  
10 and  
said receiver further comprises a filter, disposed  
between said circuitry for converting said control signals  
to said third frequency band and said circuitry for  
applying said converted control signals to said telephone  
15 link, for passing substantially only signals in said third  
frequency band.

29. The system of claim 25 further comprising  
circuitry, coupled between said telephone and said  
telephone link, for impeding signals in said first, second,  
20 and third frequency bands from being coupled from said  
telephone link to said telephone.

30. Apparatus for recovering a television signal  
sent by a source thereof over a communication link and  
applying the recovered television signal to a television  
25 receiver, said television signal including an amplitude  
modulated video component and an accompanying frequency  
modulated audio component, said apparatus comprising  
circuitry for recovering said television signal from  
said communication link, the recovered television signal  
30 possibly including noise that causes variations in at least  
the amplitude of said amplitude modulated audio component,  
circuitry for measuring said variations in said

amplitude of said audio component of said recovered television signal as an indication of the level of said noise in said video component, and using said measured variations to reduce said level of noise in said recovered television signal, and

circuitry for applying said recovered television signal with the reduced noise level to said television receiver.

31. The apparatus of claim 30 wherein said measuring circuitry includes circuitry for separating said audio component from said video component.

32. The apparatus of claim 31 wherein said audio component has a carrier frequency that is outside of a frequency band that includes said video component, said separating circuitry including a filter that substantially blocks frequencies in said frequency band.

33. The apparatus of claim 31 wherein said measuring circuitry further comprises circuitry for averaging the amplitude of said audio component over a selected time period.

41. A system for video signal communication between a source of said video signal located outside of a unit and a destination of said video signal disposed within said unit, said system comprising:

an interface coupled to said source and to a telephone link that is disposed within said unit and carries voice signals from at least one telephone connected to said link, said interface including

circuitry for receiving said video signal from said source, and

circuitry for transmitting said received video signal onto said telephone link in a selected frequency range that is different from frequencies at which said voice signals are carried on said telephone link to cause  
5 said video signal to be coupled to a receiver connected to said telephone link, said receiver being adapted to recover said video signal from said telephone link and apply said recovered video signal to said destination.

42. The system of claim 41 wherein said source is  
10 a cable that is linked to said unit and that carries a plurality of video signals, said transmitting circuitry further comprising

circuitry for selecting at least one of said video signals in response to control information from a user of  
15 said destination and transmitting said selected video signal onto said telephone link for recovery by said receiver and application to said destination.

43. The system of claim 42 wherein said unit includes a plurality of destinations each of which is  
20 connected to said telephone link by a said receiver, said selecting circuitry being adapted to respond to control information from users of said plurality of destinations by selecting one or more of said video signals and transmitting said selected video signals onto said  
25 telephone link at different frequencies within said selected frequency range for recovery by said receivers and application to said destinations.

44. The system of claim 42 wherein said destination is a television is adapted to receive said selected video  
30 signal in a predetermined frequency band, said transmitting circuitry further including

circuitry for transmitting said selected video

signal onto said telephone link at a band within said selected frequency range that allows said receiver to apply said recovered video signal to said television in said predetermined frequency band.

5           45. The system of claim 42 wherein said cable includes an electrical conductor for carrying said video signals.

          46. The system of claim 41 wherein said interface is connected to a telephone line that is connected to said  
10 telephone link and extends outside of said unit, said interface including circuitry for passing said voice signals between said telephone link and said telephone line and preventing said video signal from being applied to said telephone line.

15           47. The system of claim 41 wherein said voice signals are carried on said telephone link at voiceband frequencies, and said selected frequency range exceeds said voiceband frequencies.

          48. The system of claim 41 wherein said unit is a  
20 residence.

          49. A method for video signal communication between a source of said video signal located outside of a unit and a destination of said signal disposed within said unit, said method comprising:  
25           receiving said video signal from said source at an interface coupled to said source and to a telephone link that is disposed within said unit and carries voice signals from at least one telephone connected to said link, and  
          transmitting said received video signal onto said  
30 telephone link in a selected frequency range that is

different from frequencies at which said voice signals are carried on said telephone link to cause said video signal to be coupled to a receiver connected to said telephone link, said receiver being adapted to recover said video signal from said telephone link and apply said recovered video signal to said destination.

50. A system for video signal communication, said system comprising:

an interface coupled to a telephone link that carries voice signals from at least one telephone connected to said link, said interface including

circuitry for receiving said video signal from a source thereof that includes a transmitter adapted to apply said video signal onto said telephone link in a first selected frequency range that is different from frequencies at which said voice signals are carried on said telephone link, and

circuitry for retransmitting said received video signal onto said telephone link in a second selected frequency range that is different said first frequency range and from said frequencies at which said voice signals are carried on said telephone link to cause said retransmitted video signal to be coupled to a receiver connected to said telephone link, said receiver being adapted to recover said video signal from said telephone link and apply said recovered video signal to said destination.

51. The system of claim 50 wherein at least said destination is disposed within a unit and said interface further comprises

circuitry for receiving a second video signal from a second source located external to said unit, and circuitry for transmitting said second video signal

onto said telephone link in a third selected frequency range that is different from said first and second frequency ranges and from said frequencies at which said voice signals are carried on said telephone link to cause  
5 said second video signal to be coupled to said receiver via said telephone link, said receiver being further adapted to recover said second video signal from said telephone link and apply said recovered second video signal to said destination.

10 52. The system of claim 51 wherein the first mentioned source is also disposed in said unit.

53. The system of claim 52 wherein said unit is a residence.

54. A method for video signal communication between  
15 a source thereof and a destination, comprising:

receiving said video signal at an interface from said source via a telephone link that also carries voice signals from at least one telephone connected to said link, said source including a transmitter that is adapted to  
20 apply said video signal onto said telephone link in a first selected frequency range that is different from frequencies at which said voice signals are carried on said telephone link, and

retransmitting said received video signal from said  
25 interface onto said telephone link in a second selected frequency range that is different said first frequency range and from said frequencies at which said voice signals are carried on said telephone link to cause said retransmitted video signal to be coupled to a receiver  
30 connected to said telephone link, said receiver being adapted to recover said video signal from said telephone link and apply said recovered video signal to said

destination.

55. A system for video signal communication between a source of said video signal located outside of a unit and a destination of said video signal disposed within said unit, said system comprising:

an interface coupled to said source via a cable that is linked to said unit and that carries a plurality of video signals, said interface also being coupled to a telephone link that is disposed within said unit and carries voice signals from at least one telephone connected to said link, said interface including

circuitry for receiving said video signals from said source on said cable,

circuitry for selecting at least one of said video signals in response to control information from a user of said destination

circuitry for transmitting said selected video signal onto said telephone link in a selected frequency range that is different from frequencies at which said voice signals are carried on said telephone link to cause said selected video signal to be coupled to a receiver connected to said telephone link, said receiver being adapted to recover said selected video signal from said telephone link and apply said recovered video signal to said destination.

56. The system of claim 55 wherein said destination is a television is adapted to receive said selected video signal in a predetermined frequency band, said transmitting circuitry further including

circuitry for transmitting said selected video signal onto said telephone link at a band within said selected frequency range that allows said receiver to apply said recovered video signal to said television in said

predetermined frequency band.

57. The system of claim 55 wherein said interface is connected to a telephone line that is connected to said telephone link and extends outside of said unit, said interface including circuitry for passing said voice signals between said telephone link and said telephone line and preventing said video signal from being applied to said telephone line.

58. The system of claim 55 wherein said voice signals are carried on said telephone link at voiceband frequencies, and said selected frequency range exceeds said voiceband frequencies.

59. The system of claim 55 wherein said unit is a residence.

60. A method for video signal communication between a source of said video signal located outside of a unit and a destination of said video signal disposed within said unit, said method comprising:

receiving said video signals from said source at an interface coupled to said source via a cable that is linked to said unit and that carries a plurality of video signals, said interface also being coupled to a telephone link that is disposed within said unit and carries voice signals from at least one telephone connected to said link,

selecting at least one of said video signals in response to control information from a user of said destination, and

transmitting said selected video signal onto said telephone link in a selected frequency range that is different from frequencies at which said voice signals are carried on said telephone link to cause said selected video

signal to be coupled to a receiver connected to said telephone link, said receiver being adapted to recover said selected video signal from said telephone link and apply said recovered video signal to said destination.

- 5           61. A system for video signal communication between a source thereof and a plurality of units that include destinations of said video signal, said system comprising an interface coupled to said source and to telephone lines, each of said telephone lines serving at least one of  
10 said units and carrying voice signals to and from one or more telephones coupled to said line at said unit, said interface including

- circuitry for receiving said video signal from said source, and  
15           circuitry for transmitting said received video signal onto at least one of said telephone lines in a selected frequency range that is different from frequencies at which said voice signals are carried on said one telephone line to cause said video signal to be coupled to  
20 a receiver connected to said telephone line at the unit served by said line, said receiver being adapted to recover said video signal from said telephone line and apply said recovered video signal to one or more of said destinations at said unit.

- 25           62. The system of claim 1 wherein said source is a cable that is linked to said interface and that carries a plurality of video signals, said transmitting circuitry further comprising

- circuitry for selecting at least one of said video  
30 signals in response to control information from a user at one of units and transmitting said selected video signal onto said telephone line that serves said unit for recovery by said receiver and application to said destination.

63. The system of claim 62 wherein at least one of said units includes a plurality of destinations each of which is connected to said telephone line by a said receiver, said selecting circuitry being adapted to respond  
5 to control information from users of said plurality of destinations at said unit by selecting one or more of said video signals and transmitting said selected video signals onto said telephone line that serves said unit at different frequencies within said selected frequency range for  
10 recovery by said receivers and application to said destinations.

64. The system of claim 61 wherein said source is a cable that is linked to said interface and that carries a plurality of video signals, said transmitting circuitry  
15 further comprising

circuitry for selecting one or more of said video signals in response to control information from users at a plurality of said units and transmitting said selected video signals onto said telephone lines that serve said  
20 units for recovery by each said receiver and application to each said destination.

65. The system of claim 64 wherein said selecting circuitry is adapted to transmit a selected one of said video signals onto a plurality of said telephone lines.

25 66. The system of claim 65 wherein said selecting circuitry is adapted to transmit said selected video signal onto said plurality of said telephone lines at different frequencies.

67. The system of claim 61 wherein at least one of  
30 said units includes an internal telephone link to which a said receiver and at least one telephone is connected, said

274

internal telephone link being connected to said telephone line that serves said unit.

68. The system of claim 67 further comprising a local interface connected between said telephone line and  
5 said telephone link of said at least one unit, said local interface including

circuitry for receiving said video signal from said telephone line, and

circuitry for amplifying said received video signal  
10 and coupling said amplified video signal onto said internal telephone link for recovery by said receiver.

69. The system of claim 68 wherein said at least one unit includes a source of a second video signal that includes a transmitter adapted to apply said second video  
15 signal onto said internal telephone link in a second selected frequency range that is different said frequency range selected by said interface and from frequencies at which said voice signals are carried on said telephone link, said local interface further comprising

20 circuitry for receiving said second video signal from said internal telephone link, and

circuitry for amplifying said received second video signal and coupling said amplified video signal onto said telephone line that serves said unit to cause said second  
25 video signal to be coupled to said interface.

70. The system of claim 69 wherein said interface further comprises

circuitry for receiving said second video signal from said telephone line, and

30 circuitry for transmitting said received second video signal to said source.

71. The system of claim 1 wherein said interface is coupled between said telephone lines and corresponding public telephone lines that serve said units, said public telephone lines carrying said voice signals at voiceband frequencies, said interface further comprising circuitry for coupling said voice signals between each said public telephone line and each said telephone line at said voiceband frequencies, said selected frequency range exceeding said voiceband frequencies.

72. The system of claim 1 wherein said interface is coupled between said telephone lines and corresponding public telephone lines that serve said units, said public telephone lines carrying said voice signals at voiceband frequencies, said interface further comprising circuitry for converting said voice signals on least one of said public telephone lines to a second frequency range that exceeds voiceband frequencies and coupling said converted voice signals onto said corresponding telephone line, at least a portion of said selected frequency range including said voiceband frequencies.

73. The system of claim 12 wherein said at least one of said units includes an internal telephone link to which a said receiver and at least one telephone is connected, said internal telephone link being connected to said telephone line that serves said unit, and further comprising a local interface connected between said telephone line and said telephone link of said at least one unit, said local interface including circuitry for reconvertng said voice signals received from said telephone line to said voiceband frequencies and coupling said reconverted voice signals onto said internal telephone link, and circuitry for changing the frequency of said video

signal received from said telephone line to a frequency band that exceeds said voiceband frequencies and then coupling video signal onto said internal telephone link.

74. The system of claim 1 wherein at least some of  
5 said units are residences.

75. The system of claim 14 wherein at least some of said residences are individual houses.

76. The system of claim 14 wherein at least some of said residences are apartment units in a building.

10 77. The system of claim 1 wherein at least some of said units are offices in an office building.

78. The system of claim 1 wherein said source includes a cable having an electrical conductor for carrying said video signal.

15 79. The system of claim 1 wherein said source includes a fibre optic cable for carrying said video signal.

80. A method for video signal communication between a source thereof and a plurality of units that include  
20 destinations of said video signal, said method comprising receiving said video signal from said source at an interface coupled to said source and to telephone lines, each of said telephone lines serving at least one of said units and carrying voice signals to and from one or more  
25 telephones coupled to said line at said unit, and transmitting said received video signal onto at least one of said telephone lines in a selected frequency range that is different from frequencies at which said

voice signals are carried on said one telephone line to cause said video signal to be coupled to a receiver connected to said telephone line at the unit served by said line, said receiver being adapted to recover said video  
5 signal from said telephone line and apply said recovered video signal to one or more of said destinations at said unit.



2/46

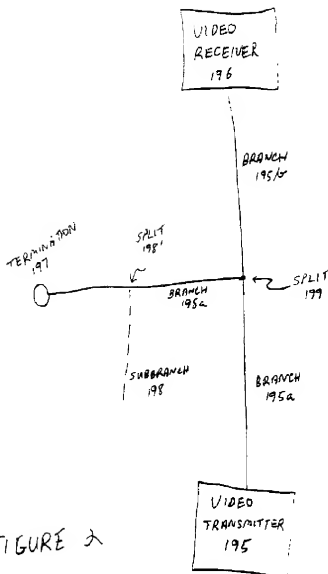


FIGURE 2

3/46

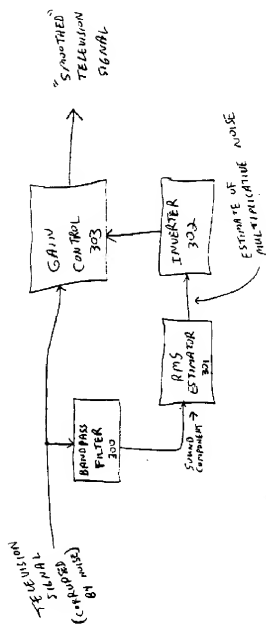


FIGURE 3

4/46

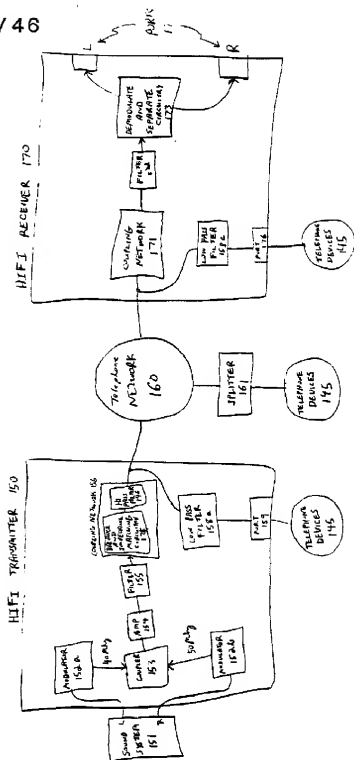


FIGURE 4a

5/46

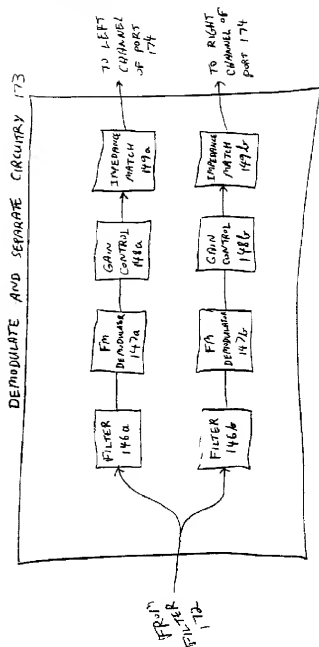


FIGURE 46

6/46

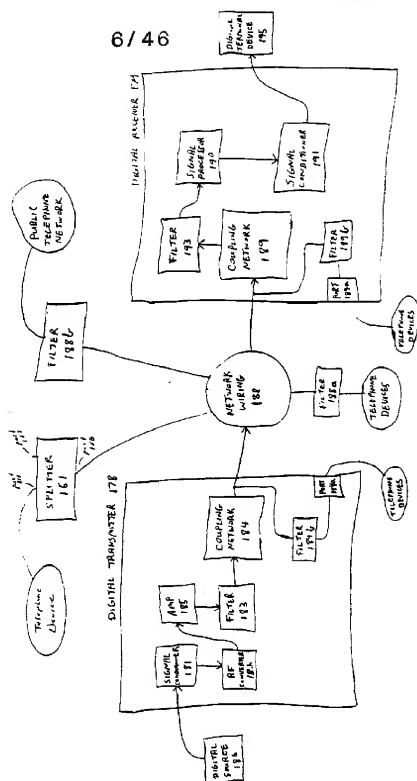


FIGURE 5

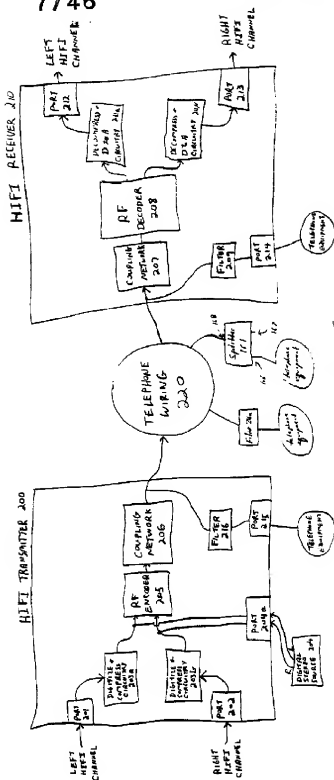


FIGURE 6

8/46

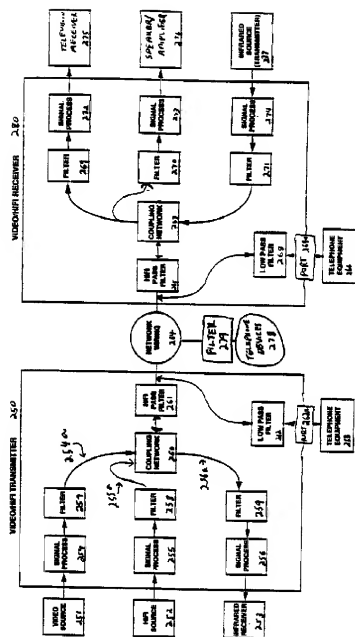


FIGURE 7

9/46

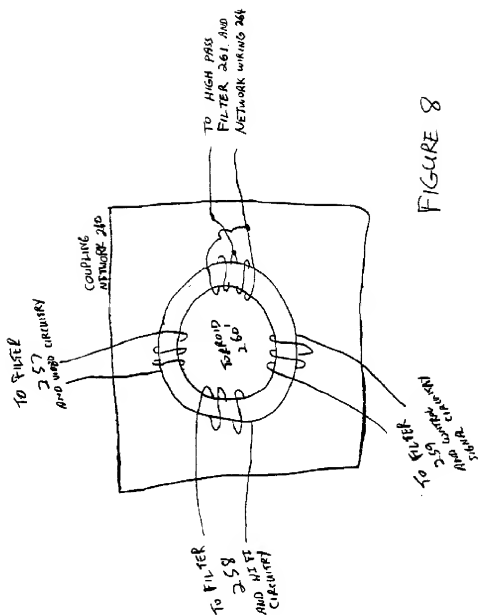
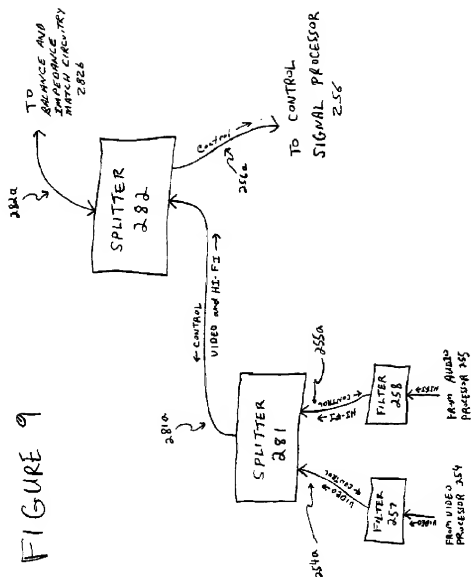


FIGURE 8

10/46



11/46

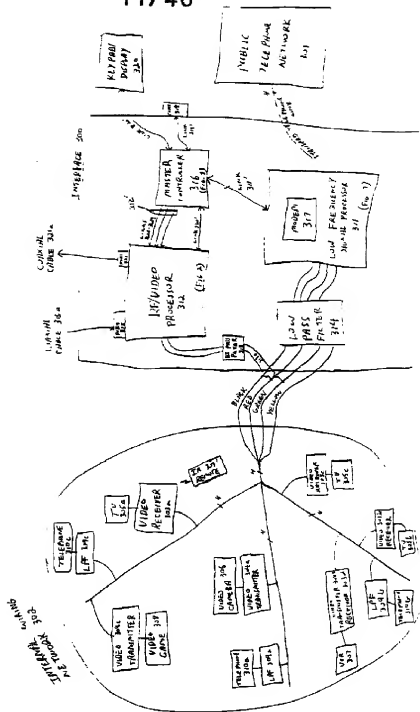
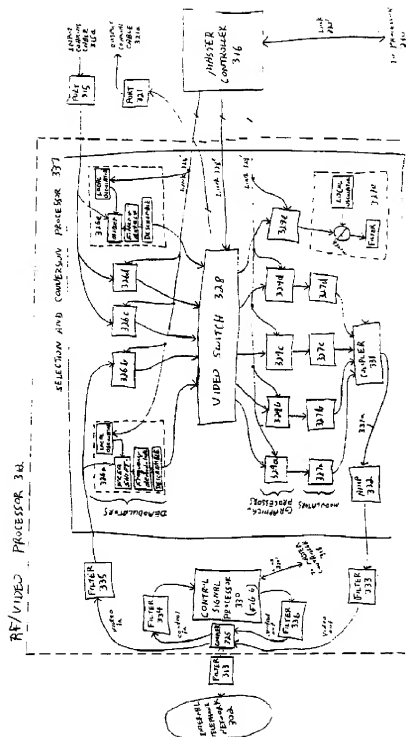
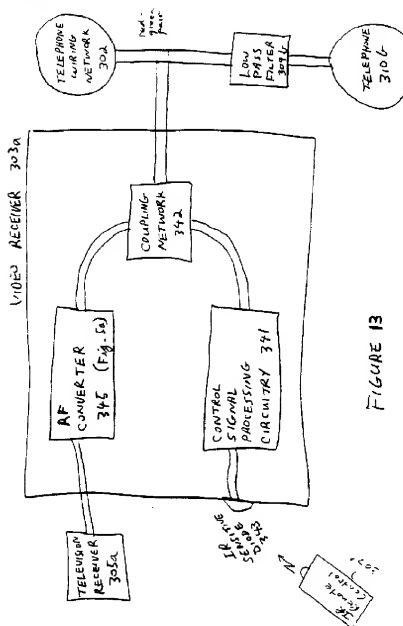


Figure 11



13/46





15/46

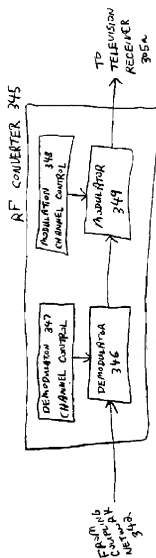
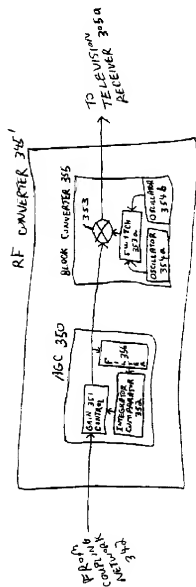


FIG. 15a



16/46

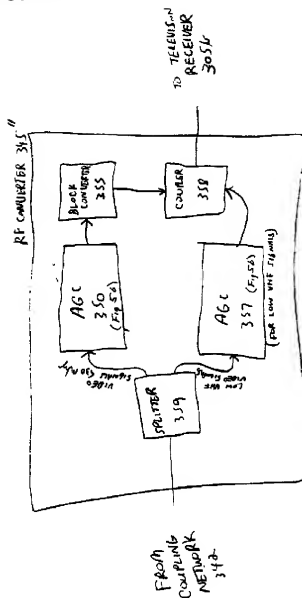
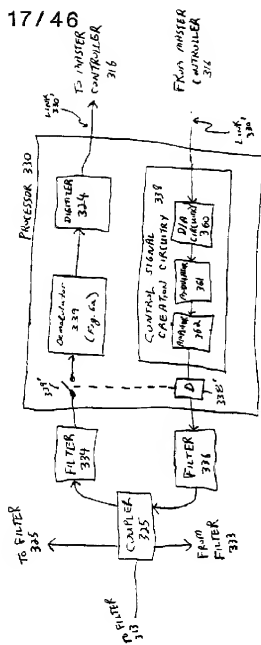


FIG. 15c



18/46

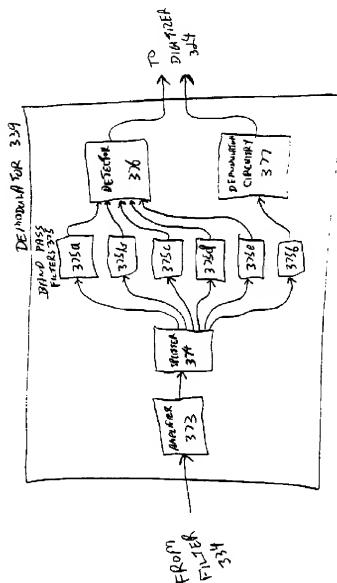


FIGURE 16a

19/46

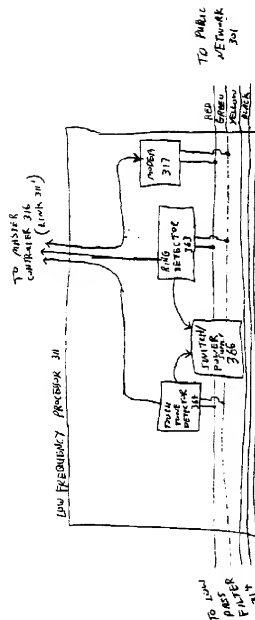


FIGURE 17

20/46

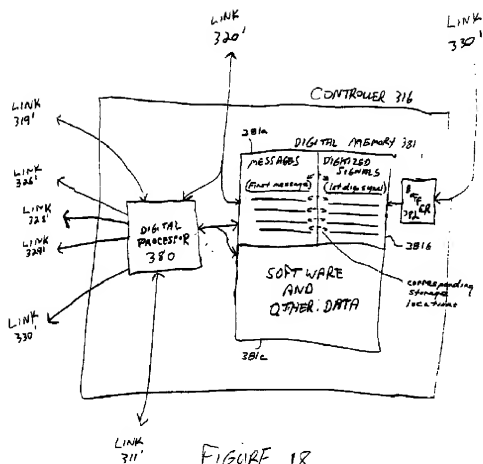


FIGURE 18